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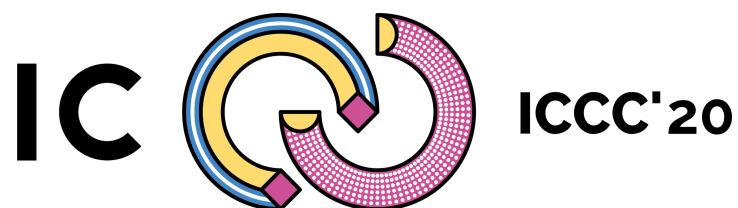
# Proceedings of the 11th International Conference

## on Computational Creativity

Editors: F. Amílcar Cardoso • Penousal Machado • Tony Veale • João Miguel Cunha

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# Co-Creative Songwriting for Bereavement Support

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*“You are always going to miss someone when they are gone, really, but I think writing about it and especially just being able to hear it played back and then being able to sing along really helped me come to terms with what I had written and how that could be interpreted”*  
–Study participant (P1)

## Abstract

Self-expression is essential to processing our thoughts and feelings and is central to successful mental health therapy. Art therapy provides a wider range of expressive mechanisms than offered through traditional approaches, allowing individuals to process their emotions when traditional therapies prove unsuccessful. Yet, effective expression through art therapy may call on a level of artistic experience that is not available to all. As such, a lack of expertise or comfort with artistic expression may hinder one’s ability to receive needed mental health support.

Creative machines can offer novel therapeutic approaches by offloading the need for creative expertise and opening up creative self-expression to those who lack the corresponding experience. In this paper, we focus on bereavement, and explore a co-creative songwriting system, ALYSIA, as a new form of therapy for those who had recently suffered the loss of a loved one. We evaluate the utility of this creative system in aiding bereaved individuals through several case studies. In addition, we discuss the utility of co-creative systems to the therapeutic context with potential application to a broad range of therapies.

## Introduction

*Why, and for whom, do we develop computationally creative systems?*

The question above will become increasingly important as our community transitions from showing that it is *possible* to develop computationally creative (CC) systems, to showing that it is *useful* to do so.<sup>1</sup> The question of *why* has been

<sup>1</sup>Of course, showing that it is possible is by no means an accomplished task: while we may have largely convinced ourselves, many members of society remain to be convinced. Assessments of whether computers can be creative may well change along with changing cultural and sociological perceptions of creativity, perhaps ultimately depending on whether the assessor *wants* to define “creative” in such a way as to include machine processes and output.

considered in a variety of contexts and domains, such as the argument in (Pease et al. 2019) that research in CC can help to address key challenges in both Automated Reasoning and Automated Scientific Discovery.

The question *for whom* was partially explored in (Colton et al. 2015), where Colton *et al.* define creativity stakeholders as “people who may have something to gain or lose from software which is creative” (*Ibid.*, p2), and suggest a non-exhaustive list of “researchers, the wider AI community, funding bodies, experts in the psychology of human creativity, neuroscientists, artists, art critics, journalists, philosophers, educators, the public, and so on” (*Ibid.*, p5).

In this paper, we offer a further answer to the question; suggesting that CC systems can be developed in order to offer novel therapeutic approaches by offloading the need for creative expertise and opening up creative self-expression to those who may lack the corresponding experience. We take as inspiration the proposal in last year’s International Conference on Computational Creativity (Cheatley, Moncur, and Pease 2019) – that CC systems can be applied to therapeutic fields – to suggest a new purpose and a new type of stakeholder. Here, we investigate one of the key provisional design recommendations for CC bereavement support tools in (Cheatley, Moncur, and Pease 2019), to *Require users participate in the creation process*, where this may “support users in interacting with their grief and lead to the creation of meaningful possessions.” (*Ibid.*, p4).

Creativity can play at least two roles in a therapeutic context: a created artefact, such as a collage of photos of someone who has died, and the process of the bereaved person putting together the collage, can both be very meaningful in the grieving process. These two roles co-align with the twin strands of research in CC: autonomous creativity in which a system creates an artefact, and co-creativity, in which system and person work together. In order to investigate the design requirement above, we focus here on co-creative systems. In general, co-creative systems are developed to benefit experts, although there has been some work in developing co-creative systems for novices, such as (Compton and Mateas 2015).

To explore the design requirement to *Require users participate in the creation process*, we consider how co-creative systems can be applied or developed to enable novices in a particular domain to have deep and meaningful interac-

tions in a sensitive context to engage in bereavement experience. We start by reviewing the literature on grief and bereavement, bereavement technology, CC, and the co-creative songwriting system ALYSIA. We then present our three-part study, in which we perform in-depth user testing on three recently bereaved participants, where we firstly introduce participants to ALYSIA through a series of videos; secondly observe them using the system to create a song related to their bereavement; and thirdly conduct semi-structured interviews in order to explore their experience in using ALYSIA in a bereavement context. In our Results section we elaborate on three key themes that emerged from our interview data: (1) Supporting self-expression; (2) Therapeutic value; and (3) Receptiveness to ALYSIA and songs created. Finally, we conclude by discussing our findings and suggesting general lessons for the CC community in this new context.

## Background

Grief is one of the most challenging experiences that most of us face during our lifetime. The passing of a loved one can increase the risk of mortality and carry significant risks to mental and physical health, including increased rates of heart attacks, strokes (Carey et al. 2014), increased blood pressure (Buckley et al. 2012), and aggravation of physical pain (Bradbeer et al. 2003). If participation in bereavement and grief is undertaken with little care, or avoided completely, these ill effects can amplify. Effectively coping with grief often necessitates the ability to engage with it, while a lack of engagement can prolong and complicate the process (Worden 2018).

While essential to the success of therapy, many find it difficult to express and engage with their grief: Patients may feel reluctant to express themselves in front of others, find themselves incapable of doing so verbally, and fear judgement (Ryder and Hospice 2018).

Helping the bereaved express themselves is a central goal of therapy. Mental health practitioners seek to provide a safe space in which people feel comfortable doing so (Rogers 1957). Some people, however, struggle to put their thoughts and feelings into words. This contributed to the rise of arts therapies, which have proven successful in helping some people express themselves and engage with their feelings (Lord 2018).

## Grief and bereavement interventions

Grief includes the process of adapting to a world without the deceased whilst maintaining a place for them in their life (Klass, Silverman, and Nickman 2014; Worden 2018). The bereaved often oscillates between avoiding and interacting with their grief, both of which can be beneficial (Schut 1999).

Formal interventions usually take the form of one-on-one sessions or group therapy with a mental healthcare professional. Interventions traditionally focus on person centred therapy or counselling in which the bereaved express themselves verbally (Arnason 2001; Newsom et al. 2017). Less traditional, person-centred arts therapies offer the be-

reaved an opportunity to express their grief through a creative medium (Lord 2018; McClocklin and Lengelle 2018; Dalton and Krout 2005).

Most traditional bereavement interventions are not based on technology, but rather traditional talk therapy. When technology is used, systems designed to support those going through bereavement focus less on creation and more on curation and social interaction. For example, people make memorial pages on websites such as Facebook and write to or about the person they have lost. These interactions can be helpful to the bereaved (Refslund Christensen and Sandvik 2015; Refslund Christensen and Gotved 2015; Christensen et al. 2017). However, the public nature of these methods may also put the bereaved in the presence of malicious users who can cause them emotional distress (Christensen et al. 2017; Phillips 2015; Sabra 2017).

Many systems have been theorised and implemented on a small scale by HCI researchers, mostly focusing on the bereaved person curating digital possessions to be placed within a physical container (Banks, Kirk, and Sellen 2012) or accessing already curated possessions (Kirk, Reeves, and Durrant 2011; Odom et al. 2014). Similar work, seeks to include the bereaved in the creation process of the memorial object (Story Shell) itself (Moncur et al. 2015). They found that the participant felt they had benefited therapeutically from recording memories to be incorporated into Story Shell. (Moncur et al. 2015) report that the therapeutic benefits were a result of the participant feeling that they had a receptive audience in the researchers, and could also be a result of continuing bonds with the deceased - the participant mentioned they found themselves addressing the deceased in some recordings. Despite this, Moncur et al and the participant found that other people were reluctant to contribute recordings for Story Shell as they were unsure what to record and wary of the recordings being shared. This suggests that systems, much like therapies, which facilitate user participation in the creation of memorial objects could be helpful for the bereaved, while emphasising the importance of being able to use such systems privately.

## Art therapy interventions

Interventions have been successfully applied in a variety of contexts, with more traditional forms benefiting from the therapeutic relationship and exploration of thoughts and feelings (Worden 2018). Nevertheless, the effectiveness of formal interventions is debated (Jordan and Neimeyer 2003), and further they are not always accessible when and where needed (Ryder and Hospice 2018) and can be costly.

Art therapy encourages patients to engage in the bereavement experience by expressing and exploring their thoughts and feelings, and has been shown to open up the benefits of traditional therapies to those more able to express themselves creatively (McClocklin and Lengelle 2018; Moss 2010; Glover et al. 2016; Lichtenthal and Cruess 2010). Art therapists often offer a series of workshops to their clients, holding off on more creative activities until they have had time to build a therapeutic relationship with the client and make them feel comfortable being creative (Moss 2010; O'Connor et al. 2003; Kohut 2011).

Arts therapies have been reported to enable people to express themselves, gain new insight, make sense of their loss and continue bonds with the deceased. (McClocklin and Lengelle 2018) spoke specifically about the benefits of writing as part of recovery from grief. They argued for several advantages of writing over talking: (1) it can be done privately; (2) thoughts and feelings can be captured when experienced and shared when the bereaved is ready; (3) the internal dialogue fostered by writing can make it easier to express thoughts or feelings to others; and (4) thinking and writing about bereavement can help normalise the experience, which again can make it easier to talk about.

## Music therapy

Music therapy in a bereavement context involves creative songwriting in a clinical music therapy setting and “point[s] to positive growth in bereaved adolescents through creative songwriting” (Dalton and Krout 2005). Songs that emerge from this process are “often emotional, challenging, and deeply thought provoking, and can provide a valuable contribution to our understanding of the experience of terminal illness, death and loss.” (Heath and Lings 2012) The latter of these studies explores the potential of music therapy for a somewhat experienced lyricist and a novice.<sup>2</sup>

Dalton and Krout (Dalton and Krout 2006) conducted a more in depth study investigating the use of music therapy for bereavement groups. The groups would go through the entire songwriting process together, from theme selection, to writing original drum tracks, melodies, and lyrics, to the performance and recording of the song. They found that this process “proved to be engaging and offered a safe, creative method of addressing the difficult subject matter of a loved one’s death.”

Dalton and Krout argued the “structured flexibility” of their methodology “allowed group members to creatively address the five grief process areas and discuss individual issues related to their loved one’s death” and the lyrics created by participants “showed insight and creativity in identifying, expressing, and processing personal issues related to areas of understanding, feeling, remembering, integrating, and growing.”

These works suggest that the creation process, and the exploration of the created work, are as important, if not more so, than the final product.

## Computational Creativity Systems for Bereavement

Cheatley *et al.* argued that CC can usefully be applied to therapeutic fields (Cheatley, Moncur, and Pease 2019). They investigated reminiscence practices of 13 bereaved participants, exploring possessions used to support reminiscence and participants’ receptiveness to CC being used in this context. They used their findings to identify the following 10 provisional design recommendations for CC in a bereavement context: (1) Be available freely online; (2) Output

<sup>2</sup>To enable the novice to write songs, the therapist closely collaborated with the novice over a period of three sessions.

physical and digital possessions; (3) Present framing information; (4) Incorporate degradation into digital output;<sup>3</sup> (5) Require users participate in creation process; (6) Allow for a varied source of input; (7) Employ sentiment analysis; (8) Allow for and foster repeated use; (9) Allow private and collaborative creation; and (10) Be secure and private. Of these, some (for instance, (1, 8, and 10), are straightforward requirements for system developers. Many, such as (3), require further investigation in order to be thoughtfully designed.

We deem (5) to be one of the most fundamental requirements, since previous work conducted by Moncur *et al.* (Moncur *et al.* 2015) and Dalton and Krout (Dalton and Krout 2006) found participation in the creation process can be therapeutic and as such lends credence to this line of enquiry. In this paper we focus on further exploring this particular requirement, while our case study and findings also overlap with some of the other requirements (such as 10).

One of the challenges identified in (Cheatley, Moncur, and Pease 2019) is to encourage people who may not think of themselves as creative to engage in a creative process. Co-creative systems can be applied in the bereavement context to overcome this challenge. Their creative abilities offset or even eliminate the need for any artistic expertise on the part of the bereaved. This opens up creative self-expression and the benefits of art therapy forms that are not otherwise accessible.

As an example, songwriting offers significant therapeutic benefit (as discussed above), yet its inherent complexity and multifaceted nature (consisting of lyrics writing, melody composition, music production, singing, etc) makes this form of self-expression inaccessible to most. ALYSIA (Ackerman and Loker 2017) is a co-creative system that removes the barriers that traditionally block most non-musicians from the creation of original songs, allowing everyone to express themselves through this art form.

By offering a flexible co-creative framework that facilitates self-expression, ALYSIA shines a light on what co-creativity can offer to bereavement and potentially other therapeutic practices. Other systems, facilitating expression through, for example, visual art or dance, may offer other forms of healing self-expression. This opens up the possibility of a new direction for co-creative systems: Offering therapeutic value through artistic self-expression to those without the corresponding training and expertise.

In addition to the fundamental offering of a creative partnership that offsets the need for artistic expertise, co-creative systems may carry additional benefits in the form of wide accessibility and cost efficiency.

## ALYSIA: Co-creative songwriting

This paper explores the benefits of one co-creative machine partner, the ALYSIA songwriting system, for the bereavement process. In this section we give a brief overview of ALYSIA.

ALYSIA (Automated LYrical Songwrlting Application), has been developed over the past five years (Ackerman and

<sup>3</sup>Physical possessions gradually degrade over time. This refers to simulating a similar process with a digital item.

Loker 2017)<sup>4</sup>. Since its inception, the co-creative system aimed to enable everyone, irrespective of their level of musical expertise, to express themselves through songwriting.

The process initiates with the user selecting a backing track in a genre of their choice (choosing from amongst Rock, Pop, R&B, Country, or Jazz). The user subsequently inputs topics to guide the lyrics creation, or chooses topics from a list of common options ('love', 'moody', 'anger', etc).

The first co-creative process involves lyrics creation, which can be initiated by either selecting a lyrical line created by ALYSIA (based on the user's topic), or having the user input their own lyrical line. ALYSIA generates suggestions for subsequent lines based on previous selections/inputs, adapting to the user's style if they choose to write any of the lyrical lines. Editing of ALYSIA's lines is a common use case that allows for deeper engagement.

The next step involves the co-creation of top line melodies, which fit with the lyrics and the underlying musical track. The melody system proposes different ways in which the lyrics can be sang, allowing users to choose from its suggestions, edit them, or input their own. Finally, the user may record the song in their own voice, or choose a male or female singing in-app voice. The voices can also be used to supporting learning a new vocal song, or to duet with the users.

ALYSIA allows novices to rely heavily on its suggestions, while letting more advanced users input their own lyrics, melodies, or vocals. Users often become more independent through repeated interactions with the system (for example, gradually editing more of ALYSIA's suggestions, and eventually starting to enter their own ideas for lyrics and melodies). Experienced songwriters find ALYSIA's suggestions helpful for exploring the creative space and breaking out of writer's block.

ALYSIA has been commercialised by WaveAI and is broadly accessible to the public on the App Store, allowing its creators to further improve the system through an abundance of implicit and explicit user feedback (Ackerman and Pérez y Pérez 2019). To date, over 30,000 songs have been created with ALYSIA. Users span the expertise spectrum, from novices to established songwriters.

## Experimental Setup

An evaluative research study ("user testing") was conducted to explore whether the process of co-creating a song with a computationally creative system can help bereaved people interact with their bereavement and be an enjoyable experience. This involved the researcher introducing participants to ALYSIA through a series of three short videos, and then asking them to create a song related to their bereavement. Participants engaged in semi-structured interviews which sought to elicit further information on: their experience using the system; listening to the song; engagement with be-

<sup>4</sup>ALYSIA has been developed significantly since the 2017 publication (Ackerman and Loker 2017) and the version used in this study is publicly available on the App Store. See [www.withalysia.com](http://www.withalysia.com) for more details.

reavement; and their receptiveness to such systems. See Figure 1 for an example depicted on ALYSIA's melody screen and karaoke screen (the final creation screen).

**Recruitment and Participants** For inclusion participants had to be over the age of 18 and speak English fluently, this was to ensure participants understood what they were asked to do and the potential implications of participation. There were no exclusion criteria set for gender, country of origin, etc. We recruited a total of 3 participants through contacts made in previous studies, snowball sampling. Participants have been anonymised via the assignment of pseudonyms (P1-P3). P1 was a 28 year non-religious female who had been bereaved of her grandmother less than a year ago. P2 was a 57 year old non-religious female who had been bereaved of her mother less than a year ago. P3 was a 56 year old non-religious male who had been bereaved of his spouse 5 - 10 years ago. All three of the participants indicated they were very close with the person they had lost. The perspective of the data gathered, and the subsequent findings have been influenced by these demographics.

**Musical Experience** Of the three participants only one (P3) indicated they had musical experience. P3 commented they play several musical instruments, and had written songs in the past but despite this did not consider themselves an experienced songwriter.

**Ethics and Limitations** The University of Dundee granted ethical approval for the research. We acknowledge several limitations of this initial study: (i) participants did not use the system independently, but in the presence of a researcher, and (ii) the limited number of participants precluded the application of quantitative measures. Future work will include larger samples.

**Analysis** Thematic Analysis (Clarke and Braun 2013) was employed to analyse the responses to the open questions. Data was grouped into themes (coded) and analysed iteratively to refine these themes across all participants. NVivo 12, qualitative analysis software, was used to do this.

## Results

Three key themes were identified in the interview data on the experience of participants using ALYSIA in a bereavement context: (1) Supporting self-expression; (2) Therapeutic value; (3) Receptiveness to ALYSIA and songs created. These are discussed below.

### Supporting self-expression

Participants went into the study with pre-conceived notions of whether they were creative in general, and particularly whether they are able to write songs. Subjects P1 and P2, who had no songwriting experience, remarked "I think starting is going to be the hardest part" and "It is quite hard, I'm not very musical."

Study participants were further concerned about doing justice to the deceased. P1 commented that the process felt "daunting because I did not know how to start



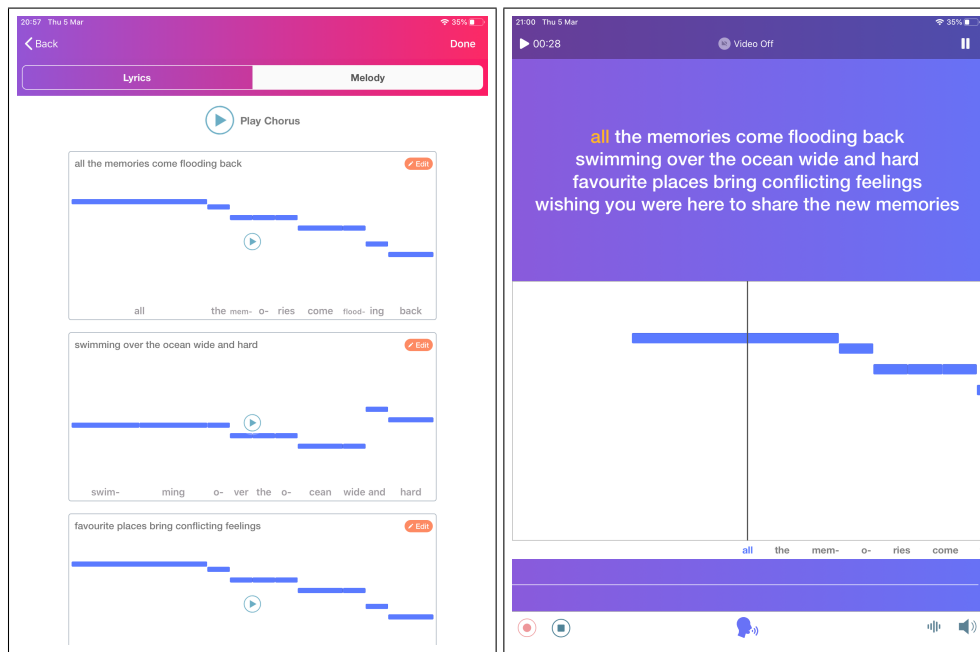


Figure 1: A song created by P1, here shown on ALYSIA's melody screen (left) and Karaoke screen (right).

it and what to write because I wanted to do it justice.” Similarly, P2 wanted it to sound “nice because you want it to reflect the person, so you don’t want to do a bad job.”

P1 remarked being able to “shuffle through a lot of [lyric] suggestions was really helpful... and it wasn’t showing the same once again which was nice.” P3, used entirely ALYSIA generated lyrics and commented “I thought the lyric writing part gave you a lot more flexibility... instead of asking what you thought it gave you lots of things and you could pick out ones you maybe didn’t realise you thought. That was very clever,” and went on to say: “The lyrics part I thought was interesting because I thought it was going to be really hard to think up lyrics but then there were lots of them there and so that made it really straightforward.”

P1 remarked on the system as a whole, “Writing a song is quite hard, especially if you have never done it before. It isn’t something you think yourself good at. I’ve never been much of a writer, and songs are largely lyrics.” P1 also felt the system gave them: “A lot of control actually, I was surprised. You can choose your melodies and things like that, the background music and you can choose different genres. I think I chose a country song which I don’t think I would have thought that I’d have chosen going into it. It gives you a large variety and you can change that depending on your mood, and you can go back and change things if you change your mind. ... I like the fact that it gave you the option to sing along, and you got to choose the melodies to go with it. ... I enjoyed it. I left feeling better about it, and about my relationship with my grandmother because I was remembering all the good past moments.”

P2 also spoke positively about the system as a whole and commented “This helps towards making people creative because it is like you have got someone else there you are

bouncing ideas off.” P2 went on to theorise that in a bereavement context, a creative aid such as this would let you bounce ideas off the system in private “which you probably want to do if you are in a grief situation” rather than doing so with other people. P3, although reportedly constrained by limited backing track options, said “I thought it [creating a song] was going to be hard but it wasn’t. It was really fine. I think it is because I found things that worked for me.”

## Therapeutic value

Participants reported numerous factors that contributed to ALYSIA’s therapeutic value. Chief amongst these were that the system supports loss-oriented activities such as interacting with feelings, reminiscing, and accepting the reality of their loss, as well as serving as a distraction from the sadness of their loss. Participants also felt that the personal nature of the creative process and the resulting song contributed to the therapeutic value of this approach.

**Engage with Grief** Participants felt that using ALYSIA helped them engage with their grief, speaking about how creating and listening to their song helped them interact with their feelings, and in some cases discover new dimensions in their grief.

P1 remarked “You are always going to miss someone when they are gone, really, but I think writing about it and especially just being able to hear it played back and then being able to sing along really helped me come to terms with what I had written and how that could be interpreted – how sad it could be and things like that... I guess I was sadder about it than I realise, but not in a bad way.” P1 shared that playing the song back to you “helps you realise what you have written and how you are feeling about it because you

are actually hearing it.”

P1 had also commented “sometimes hearing the lyrics back made me feel a bit emotional and sad... It has made me feel kind of better about it. It made me realise how much I miss her but I think it is quite good to remember people that you have lost and to think back on the fond memories, so they are not forgotten.”

P2, like P1, also experienced some sadness creating the song, “I guess it made me feel a bit sad because I was focusing on something I didn’t really want to focus on, I guess”, but “didn’t feel as sad listening to the song.” P2 theorised this was because they “were trying to put [their] feelings into words” which they found difficult to do. P2 felt they hadn’t had time to engage with their bereavement and that they “had to squash it down at the time, because it is not about you, it is about making sure other people are okay. Whereas this is you focusing on you when you are trying to write what did it mean to you, which is harder.” P3 reported they felt the lyrics generated by ALYSIA from which they could select “was helpful”, “very reflective”, and “made me think about things I didn’t really realise I was thinking about because it [ALYSIA] made suggestions.”

Participants also felt using ALYSIA helped them reminisce about the person they have lost. P1 felt ALYSIA helped them “focus more on the positive memories of her” rather than the negatives “which I think is a nice thing to do, especially when the person is gone.” They felt ALYSIA provided them with an opportunity “to think about my grandma and going back on the memories and things you kind of forget about when you’re just living day to day. It was nice. I liked it. There are little parts in the song that bring up other memories.”

P2 shared that “It made me focus a bit more on the good memories and what I enjoyed... it helped me think back on things you would want to be in a song. You want to remember the happy times, or at least I do – I’m sure everyone is different -, but it is quite nice to have that preserved in your own way”. P1 spoke positively about the reminiscence ALYSIA inspired, “I enjoyed it. I left feeling better about it, and about my relationship with my grandma because I was remembering all the good past moments,” and “It made me feel happy”. P1 also shared how they felt using ALYSIA helped them accept the reality of loss alongside their reminiscence, “It was good thinking about her and remembering all the good times and how I’m coming to terms with the fact that she is not around anymore.”

**Personal nature of creative process and creation** Participants felt the personal (or, private) nature of what they expressed to create the song and the setting in which they did so influenced the therapeutic value of ALYSIA and the song. P1 felt singing the song made it seem more personal and therapeutic, but that it led to them being “A little embarrassed I guess, because it is quite personal.”

P1 went on to say, about the song, “I kind of wanted it to be something that people could understand and not too personal... I wanted to keep those things [more personal memories] for me” and “her [the deceased], and my mum, and sister, and grandpa.” P1 didn’t want to “reveal all” about the

deceased but wanted the song to be “a little bit personal.”

P2 felt that using ALYSIA in a research setting lessened the system’s therapeutic value “because it is kind of artificial, it is kind of like ripping a band aid off, you are a bit exposed or a bit vulnerable whereas if you were doing it privately by yourself then I think it probably would [be of more therapeutic value].” P3 felt the “element of the audience” make it “less helpful”. P3 felt if they had the ability to sing the song it would maybe have been “a lot more personal, and that would have been good” and felt “music is really personal in the first place”.

### **Receptiveness to ALYSIA and songs created**

All of the participants stated they would be open to using ALYSIA again in a bereavement context, and P1 and P2 wanted copies of the songs which they said they may listen to again in the future and share with their families.

In general, all of the participants spoke favourably about ALYSIA and its use in a bereavement context, and some went on to discuss other ways they feel it could help them or others. P1, when asked whether they feel they would use the system again to engage with bereavement responded “I think this does help process what has happened because it makes you think about it a bit more or think about your time with the person or what you are feeling and I think writing them down and expressing them kind of helps you come to terms with it.” P2 responded similarly to this question, “Yeah, to be honest I would and... I think it would be a great thing for kids to actually channel things for them. I think it would be really instructive for them.”

When asked if they were still talking about in a bereavement context P2 responded “For bereavement I think you could use it because it would allow them to explore things maybe that they couldn’t tell you... because I think if you are talking to kids you tend to direct them as to how you think they are feeling which might not be how they are feeling at all and then you could end up making things worse for them because you are leading them down a negative path because that is what you are worried about. Whereas, if you let them play with that you can actually then see the things they are saying and then maybe challenge or channel them in a bit more positive light or get them to think on more positive things.”

P2 also felt a system such as this would be helpful for parents who have lost one child of their children, theorising it would let the adults to “take time out to have your grief yourself... something they could do on their own” whilst they normalised it for their other child(ren). P3 also reported they would use ALYSIA or a system like it again in a bereavement context when asked, responding “Sure. I would use the lyrics part definitely. If I was sitting down to write a song that would be fabulous.”

### **Discussion and Conclusions**

In this paper, we explore the potential of a co-creative system for therapeutic purposes. In particular, our focus has been on bereavement, where songwriting was previously shown to help those suffering the loss of a loved one to better process their feelings and express themselves (Dalton and Krout

2006; Heath and Lings 2012). Yet, like most arts, songwriting requires skill and practice. To this end, we have selected ALYSIA, a co-creative system designed to help everyone express themselves through song, requiring no musical training or expertise.

Our study explores this therapeutic approach through a case study. This qualitative analysis helps gain insight into the nature of this approach to ascertain what aspects are or are not effective and identify how this therapeutic methodology can be improved. Future work will assess this therapeutic method on a larger number of participants and incorporate quantitative methods, such as the Warwick Edinburgh Mental Wellbeing Scale (Tennant et al. 2007).

Our findings show that participants found therapeutic value in the creative process and the resultant song, even when subjects initially had substantial doubts on their own creative abilities and particularly their abilities to create songs. The use of a co-creative system offers a novel way for the bereaved to engage with their grief and process their emotions. Notably, ALYSIA's suggestions have allowed participants to discover feelings of which they were not previously aware.

This new form of support for the bereaved has the potential to give a voice to those who otherwise struggle to connect with challenging feelings. As suggested by the participants, this form of support may also benefit children, who may otherwise find it particularly challenging to comprehend and express feelings associated with the loss of a loved one (Segal 1984). Expressive arts have been shown to help children express themselves and cope with grief (Moody and Moody 1991), and as such, expanding the children's creative capabilities through co-creative systems may be particularly effective for this population.

The ability to support a creative process without the presence of another person may be one of the main benefits of the therapeutic approach proposed here. Professional songwriters often write in groups in order to more effectively and efficiently explore the underlying creative space. On the other hand, the presence of others when creating songs related to bereavement creates discomfort and hinders expression. Future work will let users create songs in the bereavement context privately and in their own time. A creative partner that enables self-expression, without exposing one's thoughts and feeling to another person, stands to be a new, effective therapy that is uniquely enabled through co-creative systems.

Therapeutic computational creativity has the potential to offer the dual benefits of a co-creative process that can be undertaken in private, while also leading to the creation of a piece of art which can validate the user's experience and feelings and prompt further exploration of those feelings. Participants took pride in their songs (suggesting a sense of ownership for the creative artefact), as well as expressing eagerness to share the artefact with their families.

In this paper, we explore a co-creative CC system (ALYSIA) in a therapeutic context and illustrate its potential therapeutic benefits in a bereavement setting. We believe that CC systems have the potential to provide therapeutic benefit in multiple settings (e.g. depression, anxiety,

and mental wellbeing) and to enable diverse forms of self-expression across artistic fields (e.g. visual art, story writing, and poetry).

Co-creative CC systems deployed in a therapeutic context to support bereaved people have the potential to offer widely accessible, affordable therapeutic support. Through interaction with creative machines, users with diverse creative abilities will be able to better connect to themselves and reap the therapeutic benefits of engaging with and expressing their feelings. This promising novel direction widens the scope, application and value of CC, suggesting new reasons and new stakeholders as part of the answer to our question: *Why, and for whom, do we develop computationally creative systems?*

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